REMARKS

The applicant appreciates the Examiner's thorough examination of the application and requests reexamination and reconsideration of the preceding amendments and the following remarks.

The applicant acknowledges and appreciates the Examiner's indication that claims 3, 6-15, 19, 22-33, 37, 41, 42, 44, 47-56, 60 and 63 would be allowable if rewritten in independent form including all of the elements of the base claim and intervening claims. New claims 67-107 are presented in response. Accordingly, new claims 67-107 are in condition for allowance.

With respect to the applicant's originally filed independent claims, independent claim 1 recites a method of characterizing a device under test comprising injecting a signal into the device under test and measuring the response to the injected signal to determine the impedance of the device under test in the frequency domain. The method further includes converting the impedance of the device under test to a time domain, and calculating the voltage noise of the device under test based on the impedance in the time domain.

The applicant's independent claim 20 recites a method of characterizing a device under test comprising determining the impedance of the device under test in the frequency domain by constructing an s-parameter matrix and calculating the real and imaginary portions of the impedance based on the s-parameter matrix, and converting the frequency domain impedance of the device under test to a time domain by performing an inverse Fourier transform on the determined complex impedance. The method further comprises calculating the voltage noise of the device under test by convolving the time domain

impedance with a predetermined current in the time domain.

The applicant's independent claim 38 recites a system which is in pertinent part in accordance with the method of claim 1, and the applicant's independent claim 61 recites a system which is in pertinent part in accordance with the method of claim 20.

The Examiner rejects claims 1, 2, 4, 5, 16-18, 20, 21, 34-36, 38-40, 43, 45, 46, 57-59, 61, 62 and 66 under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Pat. No. 6,653,848 to *Adamian et al.*

The Examiner admits that "*Adamian et al.* does not disclose calculating the voltage noise of the device under test by convolving the time domain impedance with a predetermined current in the time domain", but the Examiner states that it would have been obvious to do so "since the calculation is a simple adaptation of Ohm's law", and that "*Adamian et al.* discloses convolution of data in the time domain to determine the output signal due to the convolution of the s-parameter data with the impulse function".

Former techniques to determine voltage noise did indeed utilize "a simple adaptation of Ohm's law", to multiply specified current in the time domain by the measured impedance in the frequency domain -- and that was the problem! The result of this multiplication of mismatching units rendered an erroneous and grossly inaccurate estimate of voltage noise. This erroneous result initiated needless re-design efforts and costs because in fact the voltage noise often was indeed within desired parameters, but this was not known because of this erroneous use of an adaptation of Ohm's law. See e.g. the application at page 4, line 15 through page 5, line 8.

In contrast to former techniques, the applicant's claimed invention calculates the voltage noise of a device under test more precisely. As the Examiner admits, *Adamian et*

al. does not disclose calculating the voltage noise of the device under test by convolving the time domain impedance with the predetermined current in the time domain. In fact, *Adamian et al.* does not disclose or teach calculating the voltage noise of the device at all. *Adamian et al.* simply discloses a general method and apparatus for characterizing multi-terminal linear devices operating in several modes. See *Adamian et al.* at column 1, lines 17-21. This is in sharp contrast to the applicant's independent claims 1, 20, 38 and 61.

The Examiner points out that *Adamian et al.* discloses that s-parameters in the frequency domain can be transferred to the time domain by utilizing a transform such as an Inverse Fourier transform. However, *Adamian et al.* does not disclose or teach measuring impedance from s-parameters in the frequency domain, and importantly, *Adamian et al.* does not disclose or teach converting the impedance of the device in the frequency domain to impedance of the device in the time domain at all, in contrast to the applicant's claims 1, 20, 38 and 61. *Adamian et al.* also fails to disclose or teach this conversion before a noise determination is made, in further contrast to the applicant's independent claims 1 and 20.

The Examiner also points out that *Adamian et al.* discloses convolution of measured s-parameter data with an impulse function. However, *Adamian et al.* does not disclose or teach convolving the impedance in the time domain with a current in the time domain. *A fortiori*, *Adamian et al.* also does not disclose or teach convolving the impedance in the time domain with a current in the time domain to calculate voltage noise, in contrast to the applicant's independent claims 20 and 61.

In fact, *Adamian et al.*'s disclosure "takes advantage" of the principle that the product of two frequency domain signals is equal to convolution in the time domain of

the Inverse Fourier Transform of (both) of these two frequency signals. See e.g. *Adamian et al.* column 10, line 62 through column 11, line 29.

This principle is neither used nor required in the applicant's claimed invention because the current naturally occurs in the time domain -- see e.g. the application at page 18, lines 10-11. Thus, for example, an Inverse Fourier Transform is performed on only the impedance in the frequency domain, and not on the current because the current is already naturally in the time domain.

Moreover, *Adamian et al.* notes in column 8, lines 35-39 the desirability of an impulse function over a step function. However, in one example the applicant's specified current, Ig(t) is a step function, not an impulse function. See e.g. the application at page 18, lines 9-19.

In summary, in sharp contrast to the applicant's independent claims, *Adamian et al.* does not disclose or teach: determination of noise in a device under test; determination of noise in a device under test using impedance; determination of impedance and converting impedance in the frequency domain to the time domain; converting impedance in the frequency domain to the time domain before the noise determination is made; or convolving the impedance in the time domain with a current waveform (already in the time domain) to determine voltage noise in the device under test.

The applicant submits that the with the knowledge of the applicant's insightful, never-before utilized method to more accurately determine voltage noise in devices under test as a starting point, the Examiner has worked backward to piece together some unrelated elements in *Adamian et al.* to reject the applicant's claims. The Examiner has used hindsight analysis, which is impermissible. In any event, as discussed above,

Adamian et al. does not disclose the applicant's claimed elements or the advantageous end result achieved by the applicant's claimed invention, namely, a more accurate determination of voltage noise.

Accordingly, independent claims 1, 20, 38, and 61 are not anticipated by or obvious over *Adamian et al.*, and are thus in condition for allowance. Claims 2-19 depend directly or indirectly from independent claim 1; claims 21-37 depend directly or indirectly from independent claim 20; and claims 39-60 depend directly or indirectly from independent claim 38. Accordingly, claims 2-19, 21-37 and 39-60 are also in condition for allowance for at least the reasons set forth above.

The Examiner also rejects claims 64 and 65 as being anticipated by *Adamian et al.*

Adamian et al. simply discloses a general method and apparatus for characterizing multi-terminal linear devices operating in several modes. To the extent that *Adamian et al.* discloses that transmission line parameters provide a complex characteristic impedance, *Adamian et al* fails to disclose a routine for automatically determining the frequency domain impedance of a power delivery system of the device under test, and fails to disclose a routine for converting the frequency domain impedance to a time domain impedance, in contrast to the applicant's amended claim 64, and in contrast to claim 65.

CONCLUSION

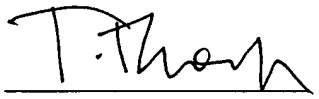
Each of the Examiner's rejections has been addressed or traversed. Accordingly,

it is respectfully submitted that claims 1-66 and new claims 67-107 are in condition for allowance.

Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,



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